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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/768,723	01/24/2001	Nan Zhang	2316.1272US01	1220

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MINNEAPOLIS, MN 55402-0903

EXAMINER
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WANG, GEORGE Y

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 01/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 09/768,723	<b>Applicant(s)</b> ZHANG ET AL.	
	<b>Examiner</b> George Y. Wang	<b>Art Unit</b> 2871	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 October 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5 and 7-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24 and 25 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-23 and 26 is/are rejected.
- 7) ☒ Claim(s) 27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
     a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-5, 7-23, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jerman et al. (U.S. Patent No. 6,134,207, from hereinafter "Jerman") in view of Roth et al. (PCT Pub. No. WO 02/21191, from hereinafter "Roth").

3. Regarding claims 1, 11, 16-17, 19-20, and 26, Jerman discloses an optical switch apparatus (fig. 12, ref. 104) and method formed on a single substrate (fig. 12, ref. 213), having an input (fig. 12, ref. 98), four outputs (fig. 12, ref. 151), a first and second actuator (fig. 12, ref. 180) coupled to a first and second mirror (fig. 12, ref. 103), respectively, such that the mirrors, which are disposed parallel to each other and offset and spaced to each other (col. 15, lines 43-65), can be moved to and from a range of extended and retracted positions (col. 16, lines 25-47) to reflect various outputs.

However, the Jerman reference fails to specifically disclose a notch in the first mirror in order to allow light to pass without being reflected.

Roth discloses a optical switching and routing device having a mirror with a notch that lets light to pass without being reflected (fig. 5a, ref. 296).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a notch in the mirror in order to increase reflective output combinations. According to Jerman, the mirrors can be fully retracted or fully extended providing a wide range of reflections possibilities (col. 16, lines 38-47). Furthermore, having a mirror with a notch that is capable of allowing light to pass without being reflected not only increases output possibilities, but also increases error tolerance without sacrificing the precision of the switch (Roth, pg. 7, lines 3-7). These advantages reduce the required fabrication costs, reduce coupling losses, and improve the overall robustness of switch and router assemblies (pg. 7, lines 7-9).

4. Regarding claims 2-5, 12-15, and 18, Jerman discloses an optical switch apparatus and method as recited above with comb drives (col. 18, lines 30-47) for positioning the mirrors in retracted and extended positions, where the first and second mirror displaced at a combination of extended and retracted positions to reflection and transmission of optical signals into four outputs (col. 16, lines 25-47).

5. As to claim 7, Jerman discloses an optical switch apparatus and method as recited above, however, the Jerman reference fails to specifically disclose a notch in the second mirror in order to allow light to pass without being reflected.

Roth discloses a optical switching and routing device having a mirror with a notch that lets light to pass without being reflected (fig. 5a, ref. 296).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a notch in the mirror in order to increase reflective output combinations. According to Jerman, the mirrors can be fully retracted or fully extended providing a wide range of reflections possibilities (col. 16, lines 38-47). Furthermore, having a mirror with a notch that is capable of allowing light to pass without being reflected not only increases output possibilities, but also increases error tolerance without sacrificing the precision of the switch (pg. 7, lines 3-7). These advantages reduce the required fabrication costs, reduce coupling losses, and improve the overall robustness of switch and router assemblies (pg. 7, lines 7-9).

6. As to claims 8-10 and 21-23, Jerman and Roth discloses an optical switch apparatus and method as recited above with comb drives (col. 18, lines 30-47) for positioning the mirrors in retracted and extended positions, however, the reference fails to specifically disclose a double-comb drive for providing a second extended position of the mirrors.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a notch in the mirror and a double comb-drive actuator since one would be motivated to move the mirrors in a second extended position and allow passage of optical signals through the notch to increase reflective output combinations. According to Jerman, the mirrors can be fully retracted or fully extended providing a wide range of reflections possibilities (col. 16, lines 38-47). This flexibility is indicative of using second extended mirror positions to provide greater output possibilities. Moreover, since double-comb drives are well-known in the art for driving mirrors and actuators, using them instead of single-comb drives involves only routine skill in the art. Therefore, it would have been obvious to one of ordinary skill in the art to use a double-comb drive to increase in the accuracy of mirror actuation and positioning would, reduce the size and cost of manufacture since it is limited (col. 1, lines 53-63), and thereby achieving a more efficient and more reliable optical switch.

***Allowable Subject Matter***

7. Claims 24-25 are allowed.

The following is an examiner's statement of reasons for allowance: As the claims were read and interpreted in light of the specification, the prior art of record fails to specifically disclose mirrors positioned in a first and second extended position and a retracted position such that the various combination of positions takes an optical beam input and provides four outputs.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

8. Claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: As the claims were read and interpreted in light of the specification, the prior art of reference fails to specifically disclose an optical switch as recited in claim 16 with only two mirrors, including a first and second mirror.

#### ***Response to Arguments***

9. Applicant's arguments filed 06 October 2003 have been fully considered but they are not persuasive.

Applicant's amendment to claims 1, 11, 16, and 19 does not overcome the prior art of record. The amendment for a notch "that lets" does not structurally distinguish the rejection set forth in the prior Office Action.

Furthermore, Applicant's main argument is that there is no motivation to form a notch as taught by Roth in the mirror of Jerman. However, Examiner asserts that it is clear that the Roth reference discloses a optical switching and routing device having a mirror with a notch that lets light to pass without being reflected (fig. 5a, ref. 296). Because according to the Jerman reference, which states that the mirrors can be fully retracted or fully extended providing a wide range of reflections possibilities (col. 16, lines 38-47), clearly, having a mirror with a notch that is capable of allowing light to pass without being reflected not only increases output possibilities, but also increases error tolerance without sacrificing the precision of the switch (Roth, pg. 7, lines 3-7). These advantages reduce the required fabrication costs, reduce coupling losses, and improve the overall robustness of switch and router assemblies (pg. 7, lines 7-9).

### ***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory



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period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Y. Wang whose telephone number is 703-305-7242. The examiner can normally be reached on M-F, 8 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 703-305-3492. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

gw  
December 23, 2003

  
TOANTON  
PRIMARY EXAMINER